

GMD3 Management Program Activities

MO River RAC meeting

Mark Rude, Executive Director
February 2, 2022



Introduction

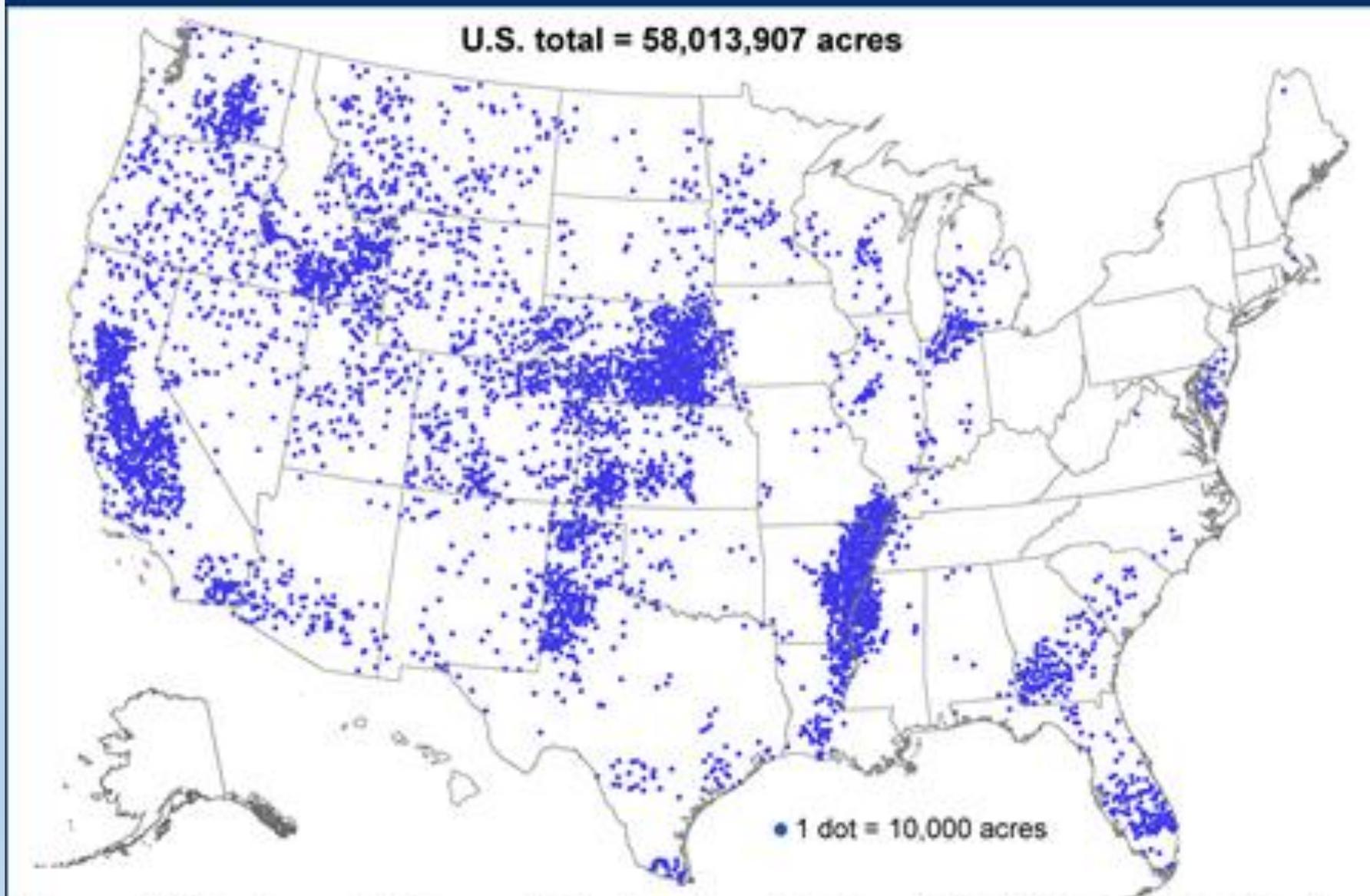
The Groundwater Commons

- Agriculture is responsible for the majority of groundwater withdrawals worldwide (Famiglietti, 2014).
- Groundwater depletion has significant implications for U.S. agriculture (Haacker et al., 2015).

Localized Groundwater Management

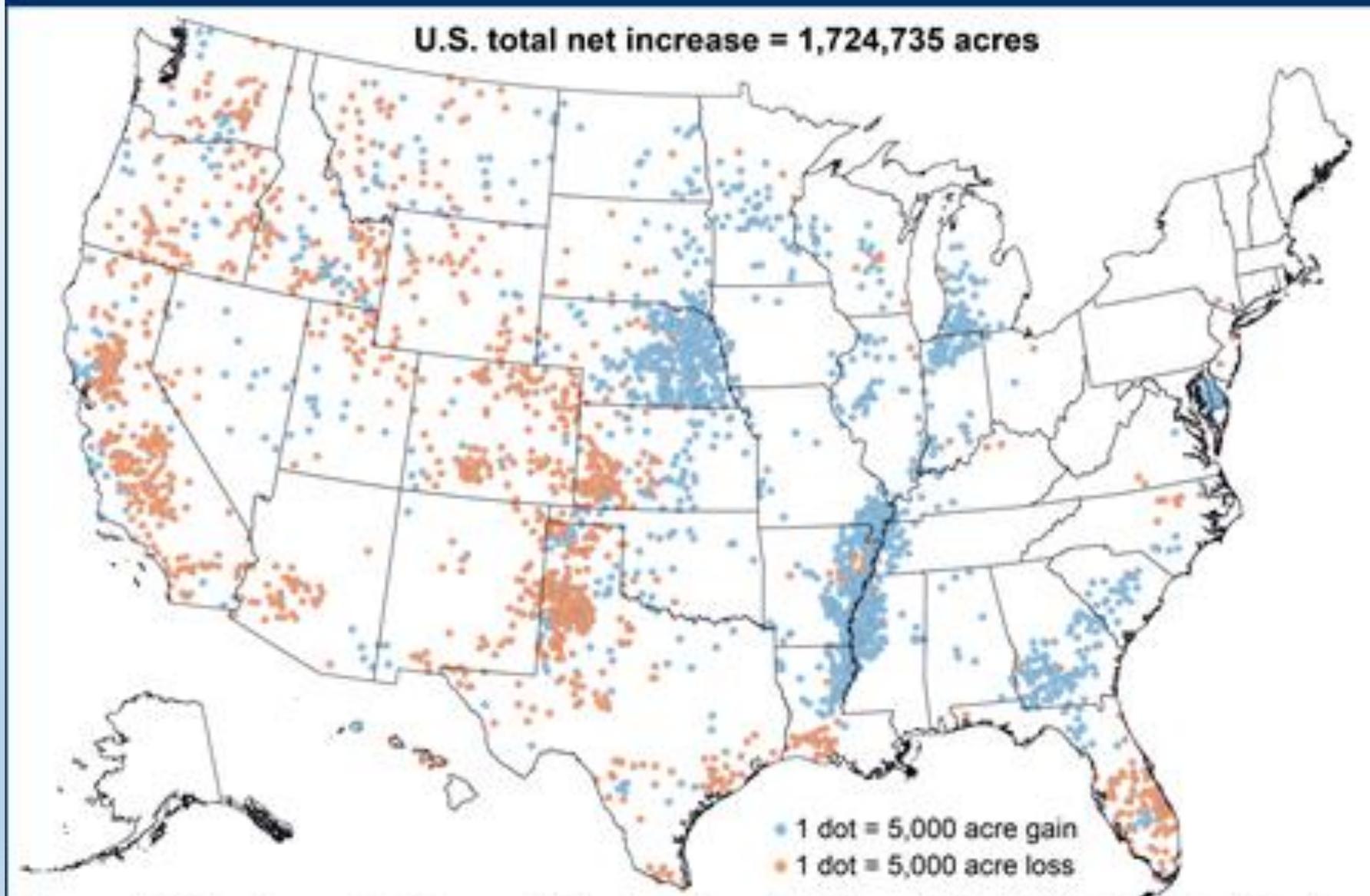
Between 2007 and 2020, the state of Kansas and the federal government jointly spent more than \$66 million to permanently retire 239 wells with annual groundwater appropriations of approximately 55,000 acre feet

U.S. acres of irrigated land by county, 2017



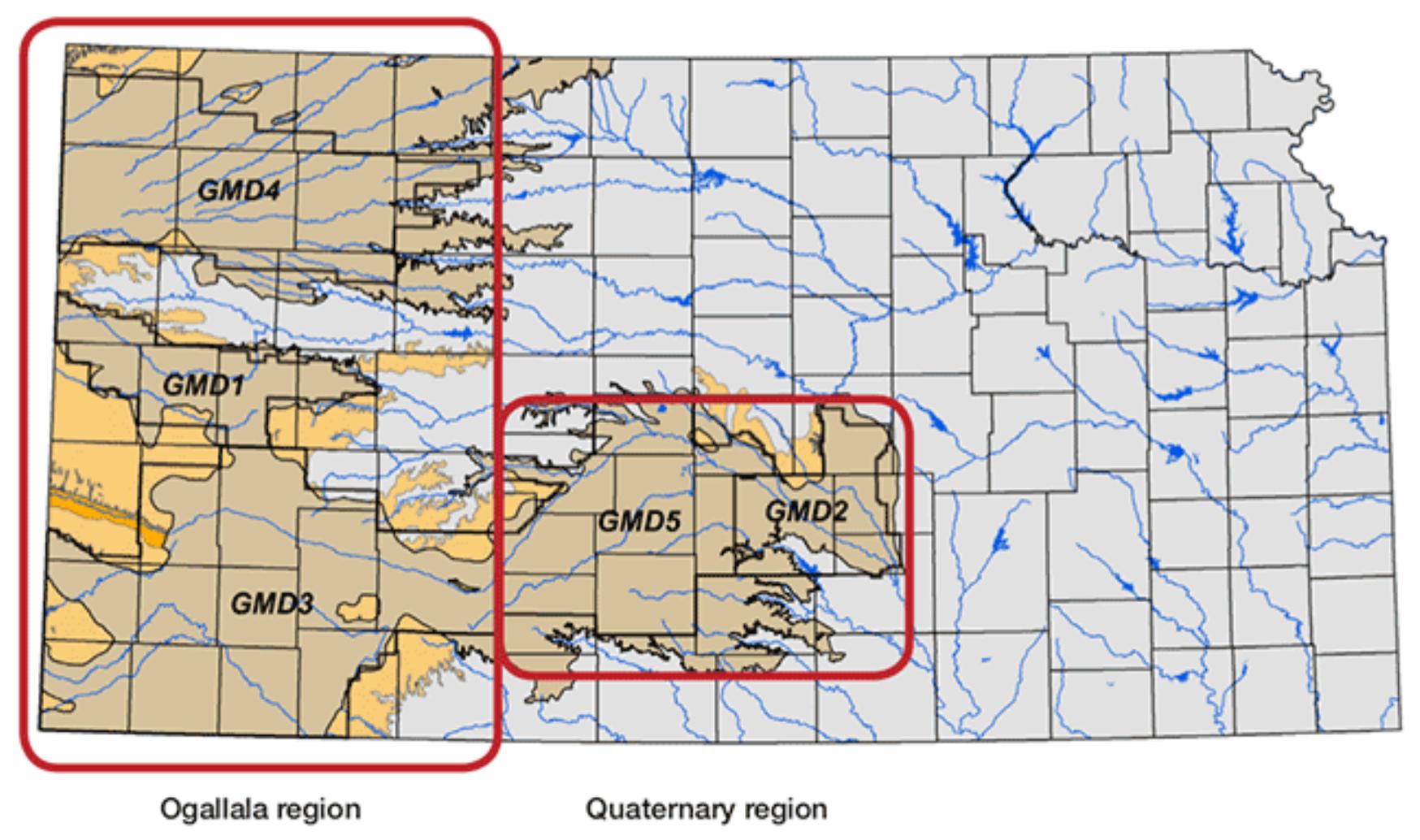
Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, 2017 Census of Agriculture.

Change in U.S. acres of irrigated agricultural land by county, 1997-2017



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, 1997 and 2017 Census of Agriculture.

Kansas Groundwater Management Districts



Active areas of the Management Program

-  Water Rights Policy Assistance
-  Water Conservation
-  Water Quality Protection
-  Models and Research
-  Ark River Management
-  Outreach and advocacy

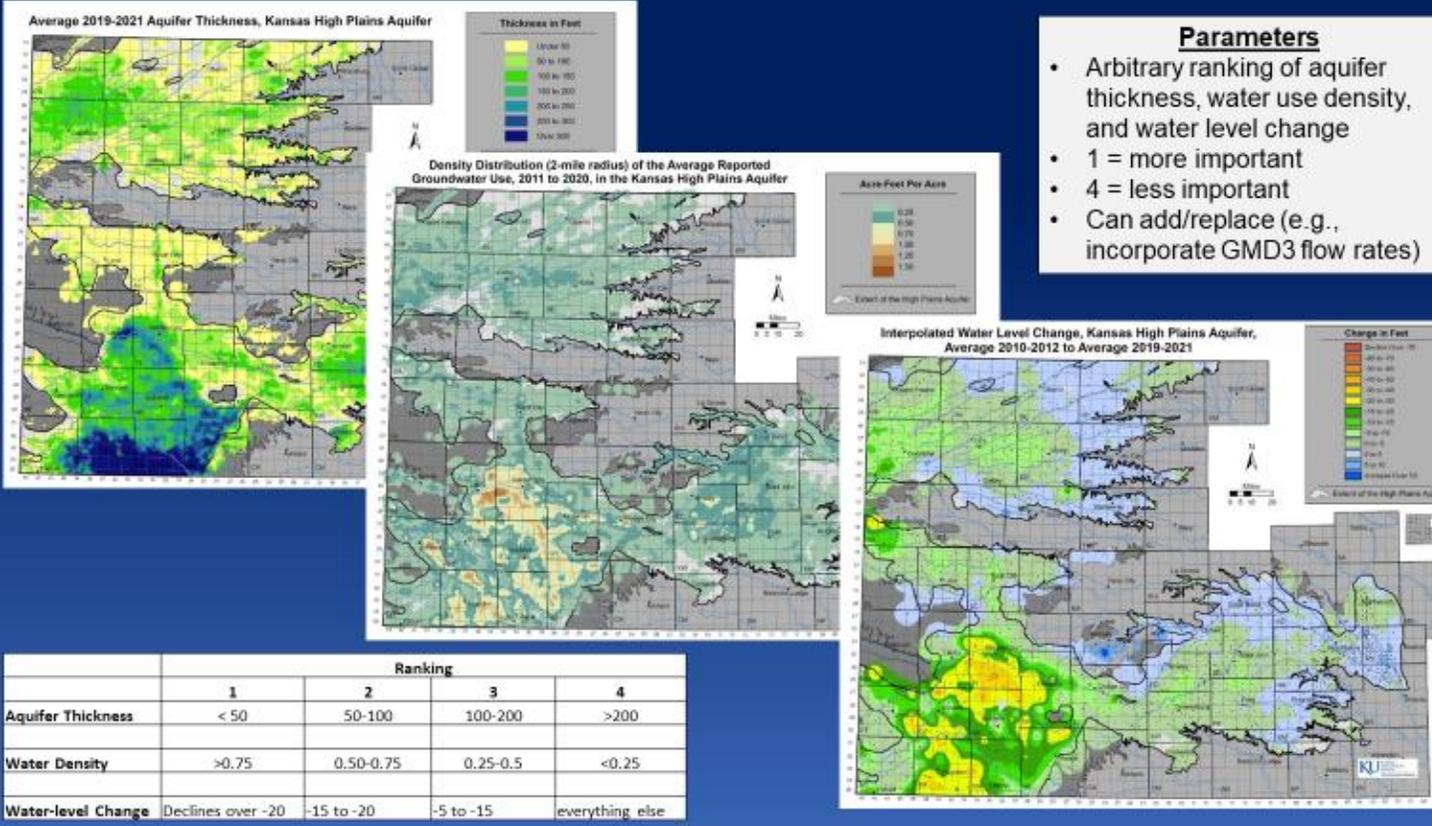
Water

GMD3 Funding Data

Table 1. Eligible land for assessment and appropriations for a water user fee (2018).

<u>County</u>	<u>Total Assessable Acres</u>	<u>Assessed Acres</u>	<u>Excluded Acres</u>	<u>Wells</u>	<u>Authorized Acre Feet</u>
Finney	625,637.27	624,438.81	1,198.46	1,085	581,233.00
Ford	662,719.10	662,006.70	712.40	660	200,531.00
Grant	357,715.95	357,570.35	145.60	642	328,266.00
Gray	536,554.15	536,063.78	490.37	1,303	420,880.00
Hamilton	71,209.95	71,209.95	0.00	73	40,871.00
Haskell	359,790.37	359,696.36	94.01	907	461,581.00
Kearny	449,230.77	448,767.60	463.17	494	233,298.00
Meade	399,646.59	399,449.21	197.38	553	278,636.00
Morton	481,659.65	481,414.11	245.54	307	129,058.00
Seward	381,891.63	381,566.10	325.53	501	281,904.00
Stanton	439,975.96	439,848.76	127.20	625	333,354.00
Stevens	467,219.07	467,018.89	200.18	705	383,949.00
<u>GMD3 totals</u>	<u>5,233,250.46</u>	<u>5,229,050.62</u>	<u>4,199.84</u>	<u>7,855</u>	<u>3,673,561.00</u>





Kansas is data strong

• Data on economy, groundwater supply and water rights drive water management decisions

Kansas Water Policy

K.S.A. 82a-711. 

- **This policy is intended to** maximize the use of Kansas limited water supply for as many beneficial purposes as possible while meeting the state's interstate delivery obligations.
- **Beneficial purpose means** that water must be used for legitimate, documentable needs and cannot be hoarded by those without an existing need for it.
- **The Chief Engineer** has a statutory mandate to “enforce and administer” the provisions of the KWA Act (K.S.A. 82a-706). Therefore, the decision whether to approve or disapprove a new or change application ultimately rests with the Chief Engineer. No “GMD fox” guarding the proverbial hen house.



GMD3 Conservation activity includes:

- Flowmeters. First GMD to mandate on all permitted wells.
- Water user technical assistance
- Conservation Innovation demonstrations.
- Required Conservation Plans are approved by the GMD.
- Assist member water groups – i.e. RAC's, and Finney County Sustainability group.
- Promote voluntary conservation
 - WCA plan review and recommendations.
 - I-CARE – Irrigation Climate And Resource Evaluation mailings to member.
 - GIVE - Groundwater Incentivized Voluntary Easement
- Eliminate need to “waste pump” to preserve water right use record.
 - Conserve-to-preserve calculations for the record.



Monitoring Services & Agreements

Flow tests, seals, tags and field data



Installed Meter gpm

NON-INTRUSIVE FLOWMETER TEST		Serial number	Price
Manufacturer	PORTAFLOW		
Model		Pipe thickness	.105
Pipe OD	8.0		70" PS
Test location	SS River		
Transducer spacing	5		
Signal Strength	4621	ns	4223
Sound Speed			
Time	1430		1440
Observed Flow Range	417 - 424		
RESULT:	Standard meter rate	4223 gpm	
Remarks		13.0	gpm (+ or -)
	Installed gpm - Standard gpm =		
	GPM Difference = Standard gpm = calculated % difference		



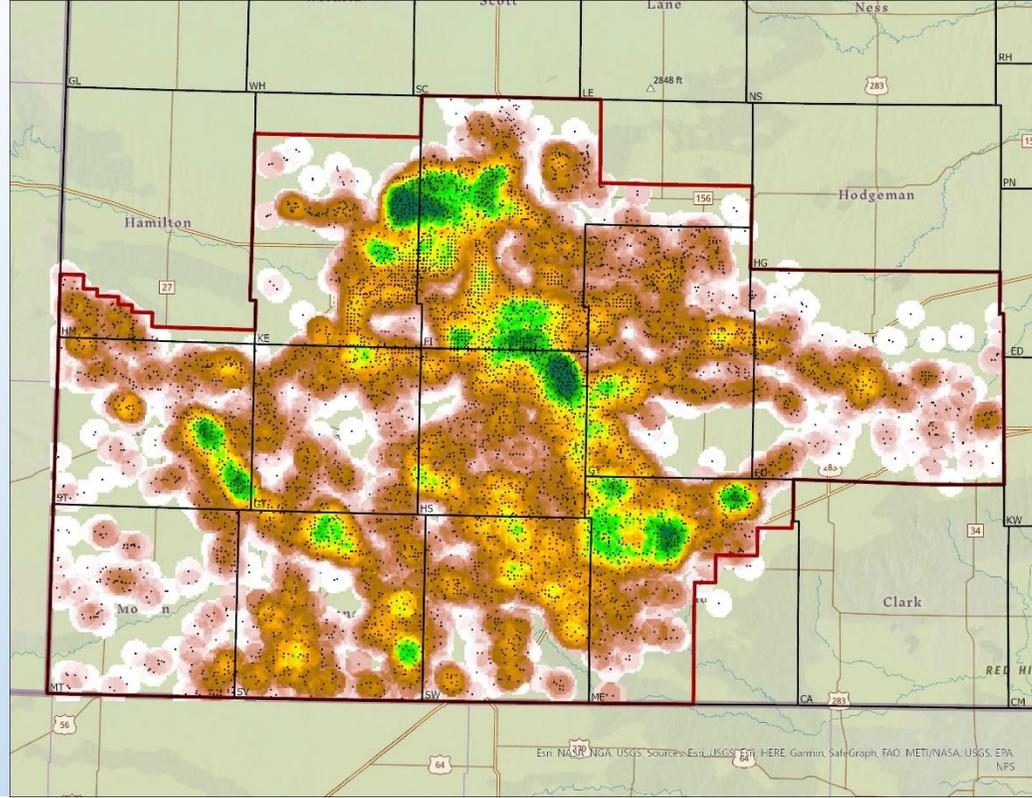
Check out:
SW Kansas
Groundwater
Productions



Chris Law
Director of Field Services GMD3

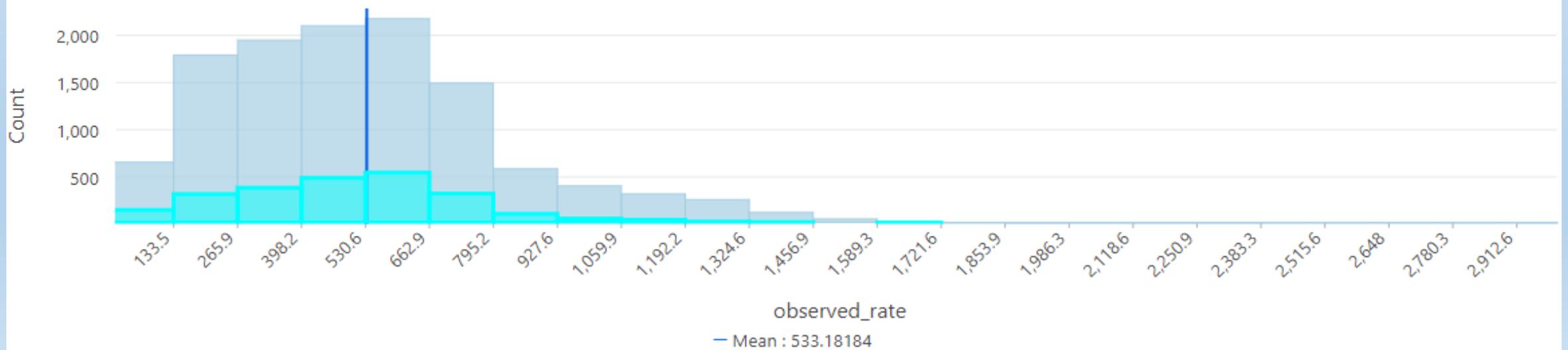


Well Pumping Rates



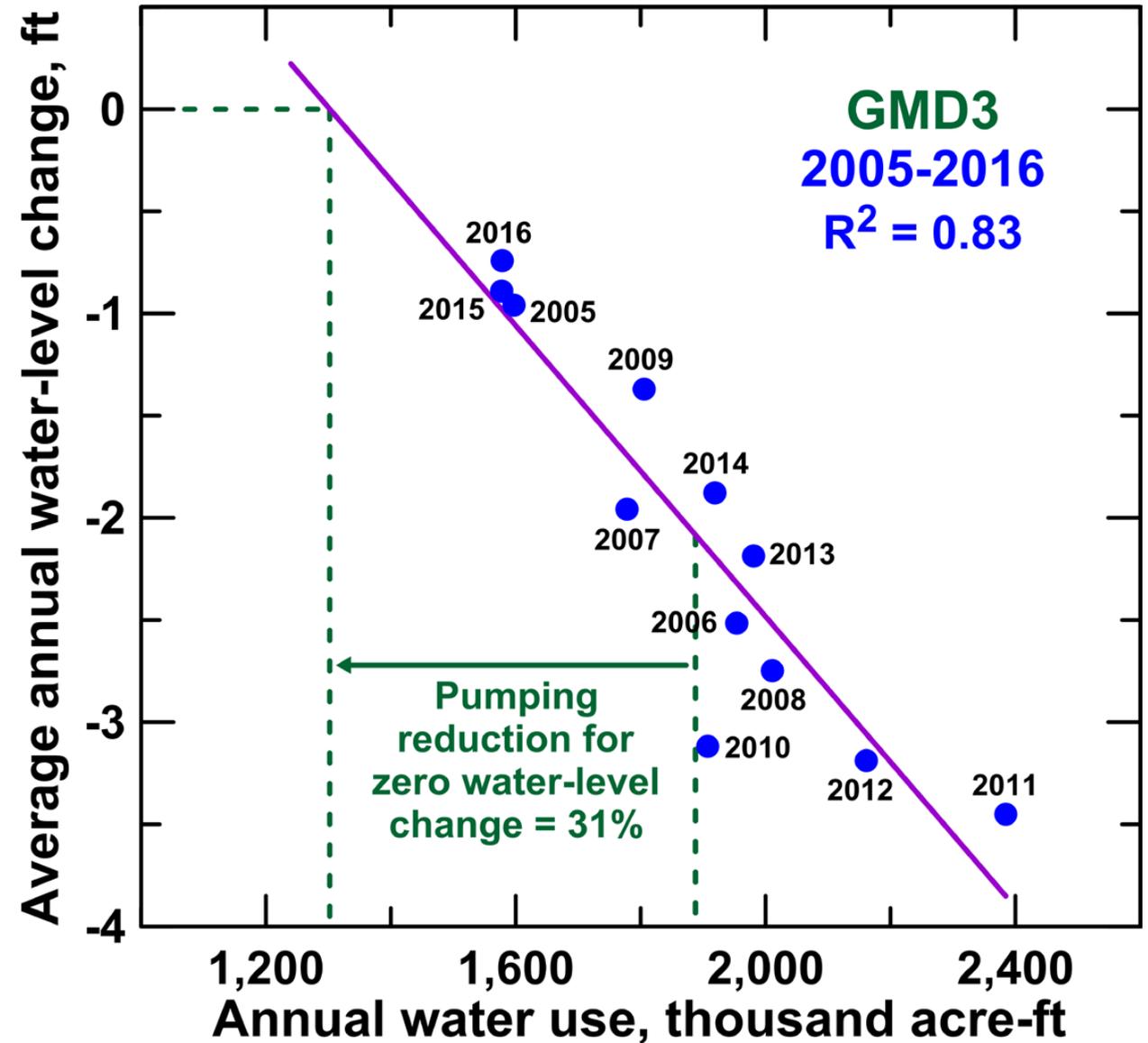
Statistics		
	Dataset	Selection
<input checked="" type="checkbox"/> Mean	533.2	491.0
<input type="checkbox"/> Median	501	499
<input type="checkbox"/> Std. Dev.	311.3	234.8
Rows	11,967	2,300
Count	11,967	2,300
Nulls	0	0
Min	1.2	2.36
Max	4,236	1,721
Sum	6,380,587.1	1,129,367.9
Skewness	1.4	0.42
Kurtosis	8.9	3.7

Distribution of observed_rate

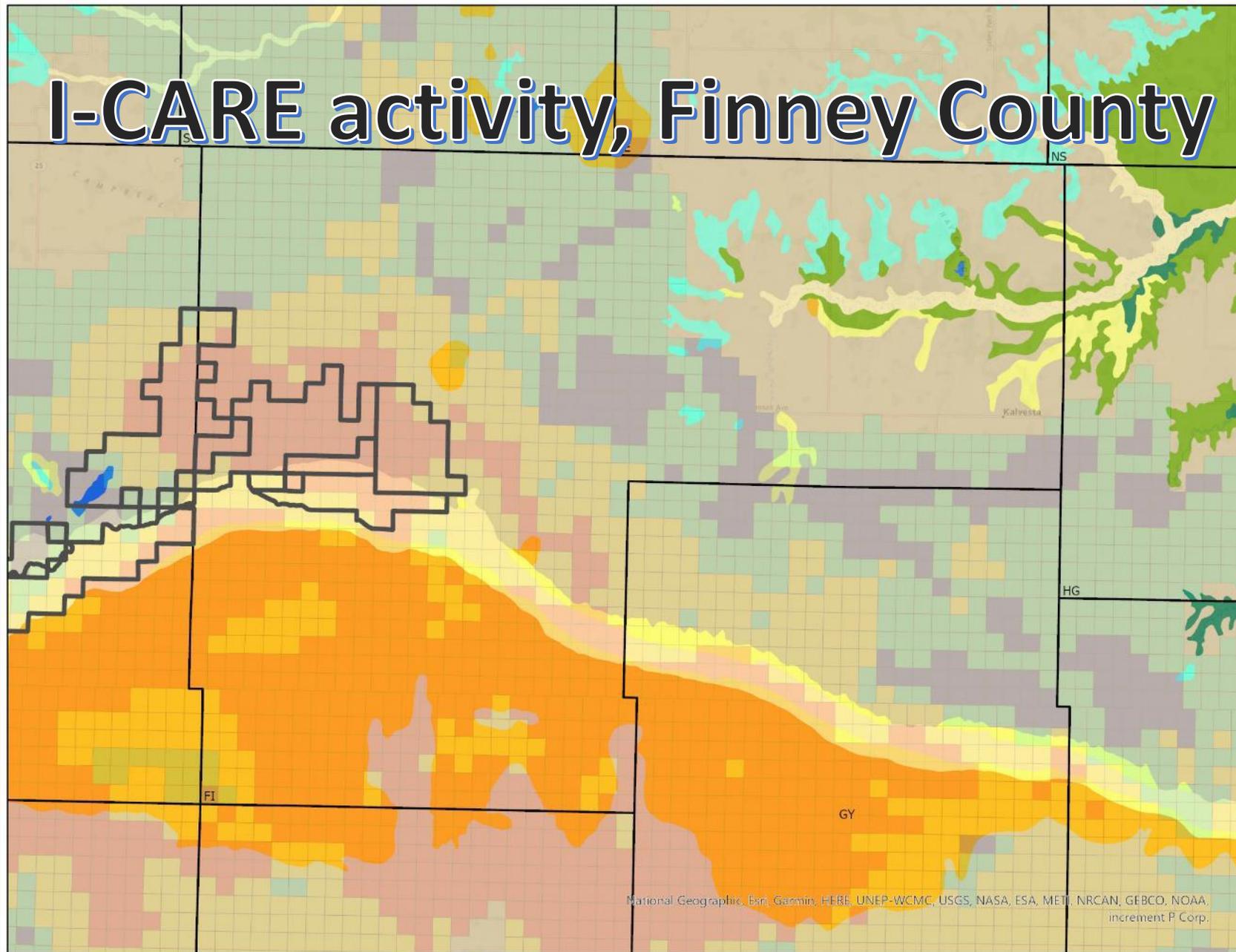


SW Kansas groundwater depletion trends

- We can get to near stable groundwater levels if we reduce and/or replace consumption by about 700,000 acre-feet annually (KGS).



I-CARE activity, Finney County

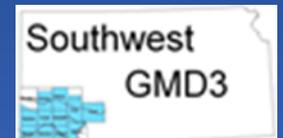


Irrigation-Climate And Resource Evaluation

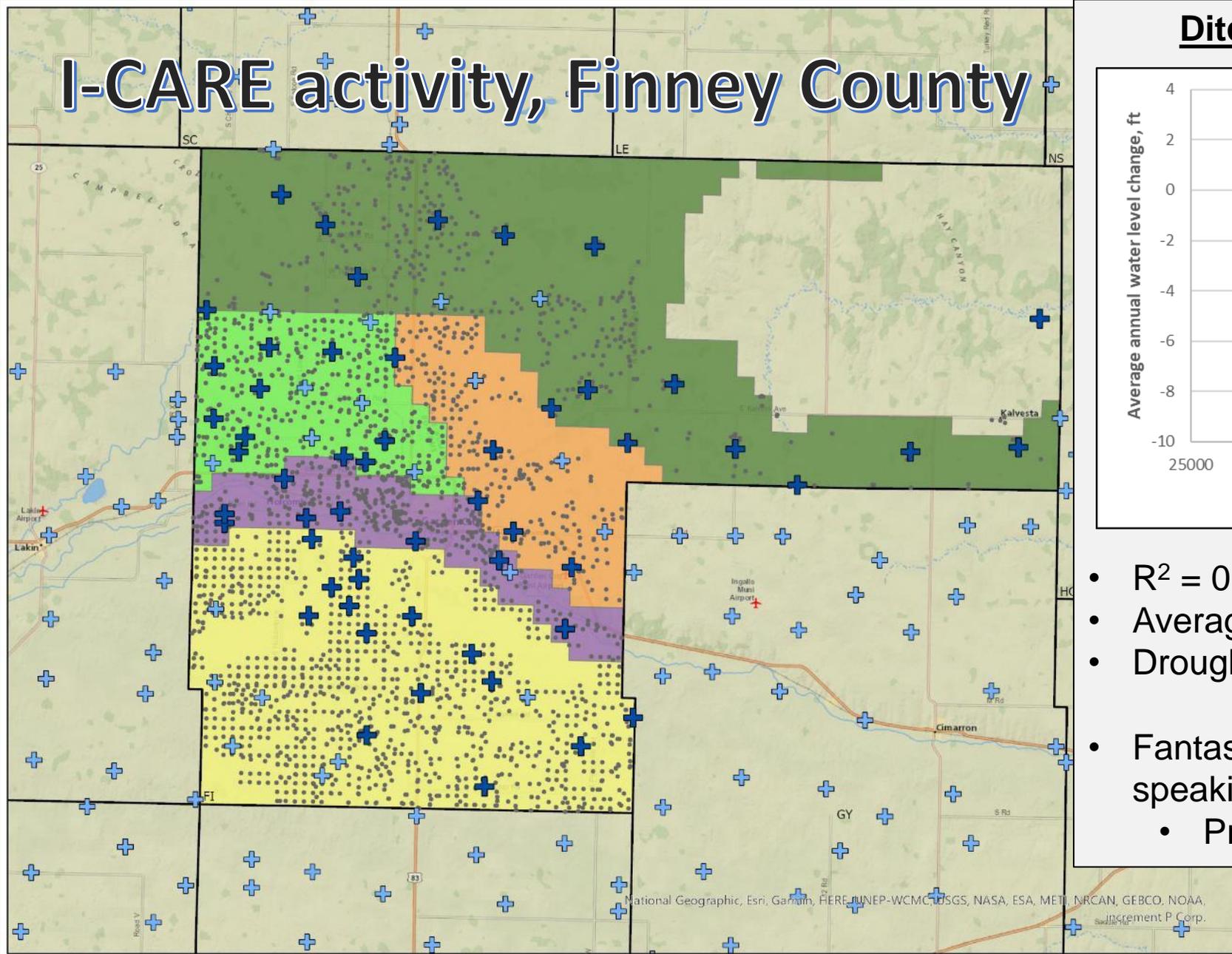
Start with basic water use data.

Overlay Other Features

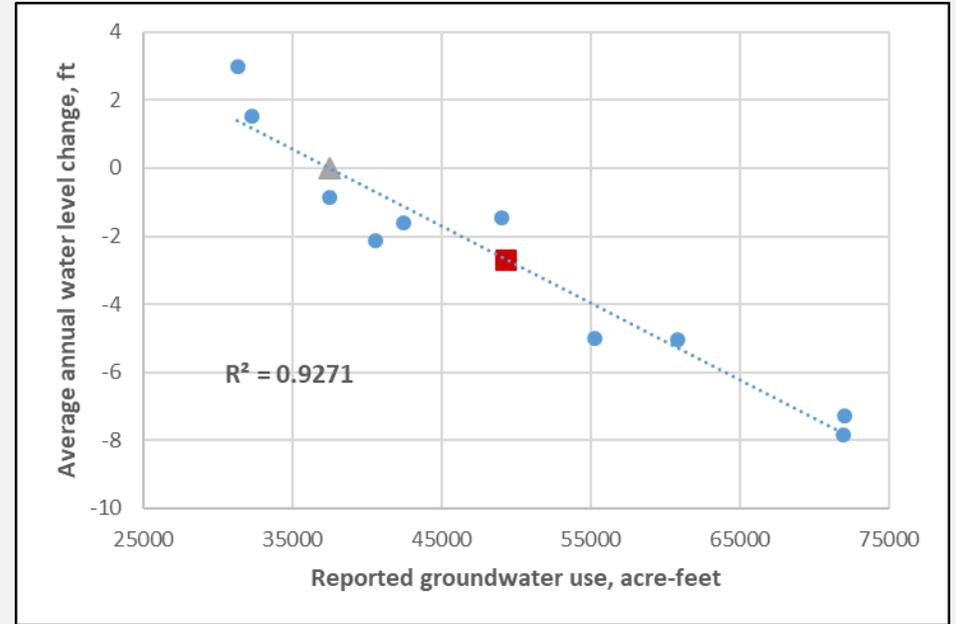
- Ditch Service Area
- Geology
 - Loess (~north of river)
 - Ark River Alluvium
 - Sand Hills (~south of river)



I-CARE activity, Finney County



Ditch Service Area (light green)

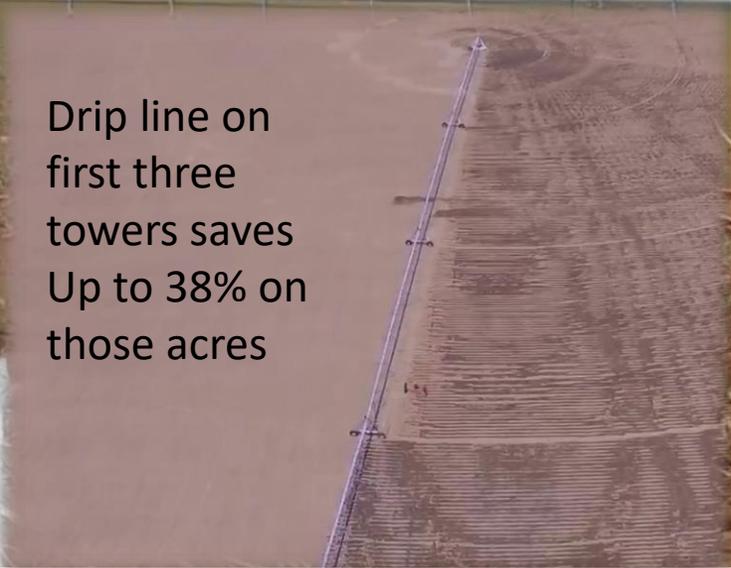


- $R^2 = 0.927$ $P < 0.00001$
- Average Q stable % reduction = 23.9%
- Drought (2011) % reduction = 47.9%
- Fantastic relationship (statistically speaking)
 - Provided by KGS Assistance

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



GMD3 Member Conservation Innovations



Drip line on first three towers saves Up to 38% on those acres



Subscribe YouTube Channel :

Southwest Kansas Groundwater Productions for latest informational videos.



Clay Scott
Ulysses Kansas



United States Department of Agriculture

Project support by a Conservation Innovation Grant from USDA's Natural Resources Conservation Service of Kansas



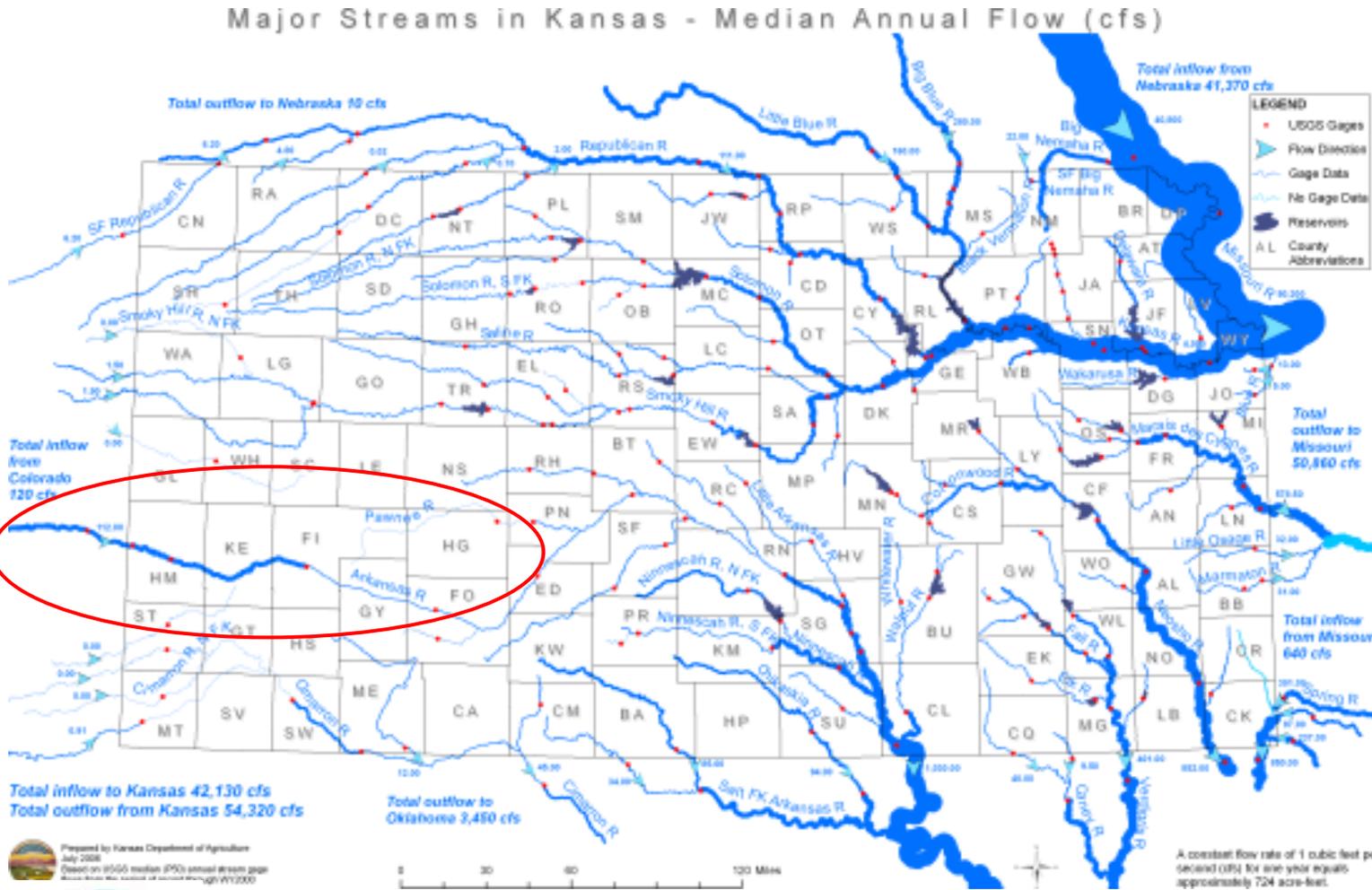


Conservation Projects improve water management systems



The quality of water affects how the water can be used.

Arkansas River basin functions as a closed basin in SW Kansas.





FOUND AT VERYFUNNYPICS.EU

PRIORITIES



Surface water flow in rivers of the U.S.
for available high flows & Water West

Feast and Famine: Securing Kansas Water Needs

Award Winning Documentary

Kansas water users and officials describe water supply problems and discuss the dire need to collaborate now on water transportation projects before it's too late.



Documentary:
General Education and Discovery.

- Garden City Co-op
- Skyland Grain
- GMD3

See: Kansasaqueductcoalition.com

Water transport

POC 2020

Missouri River to dry Ark River



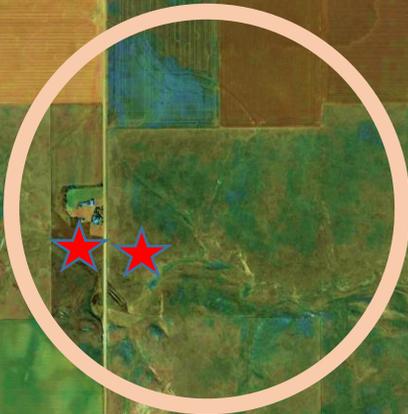
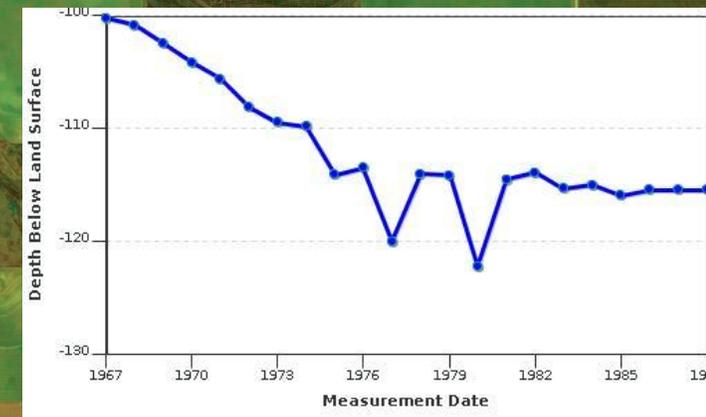
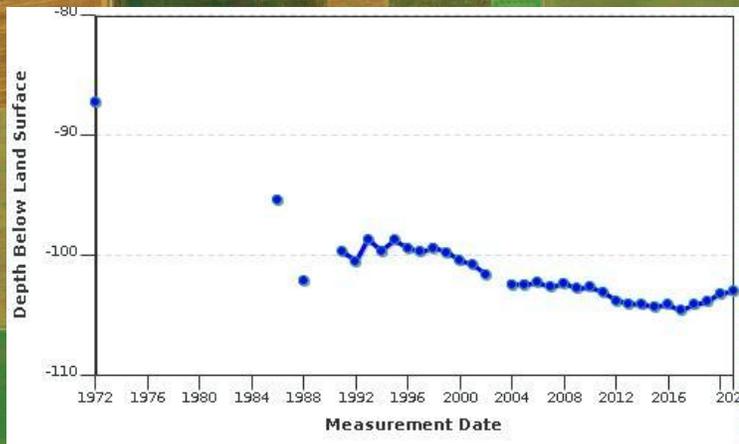
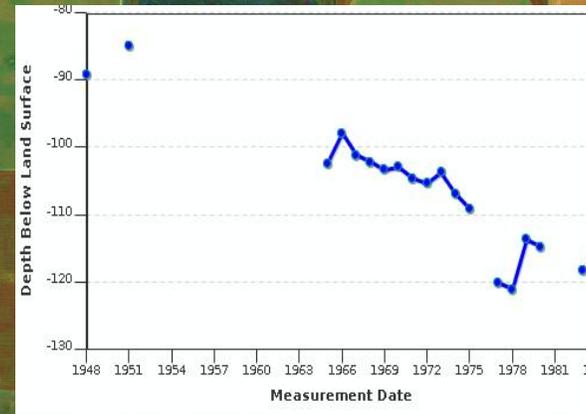
An interstate transport POC into Colorado is planned in 2022



Wichita County aquifer release site in area
that is suffering groundwater rationing

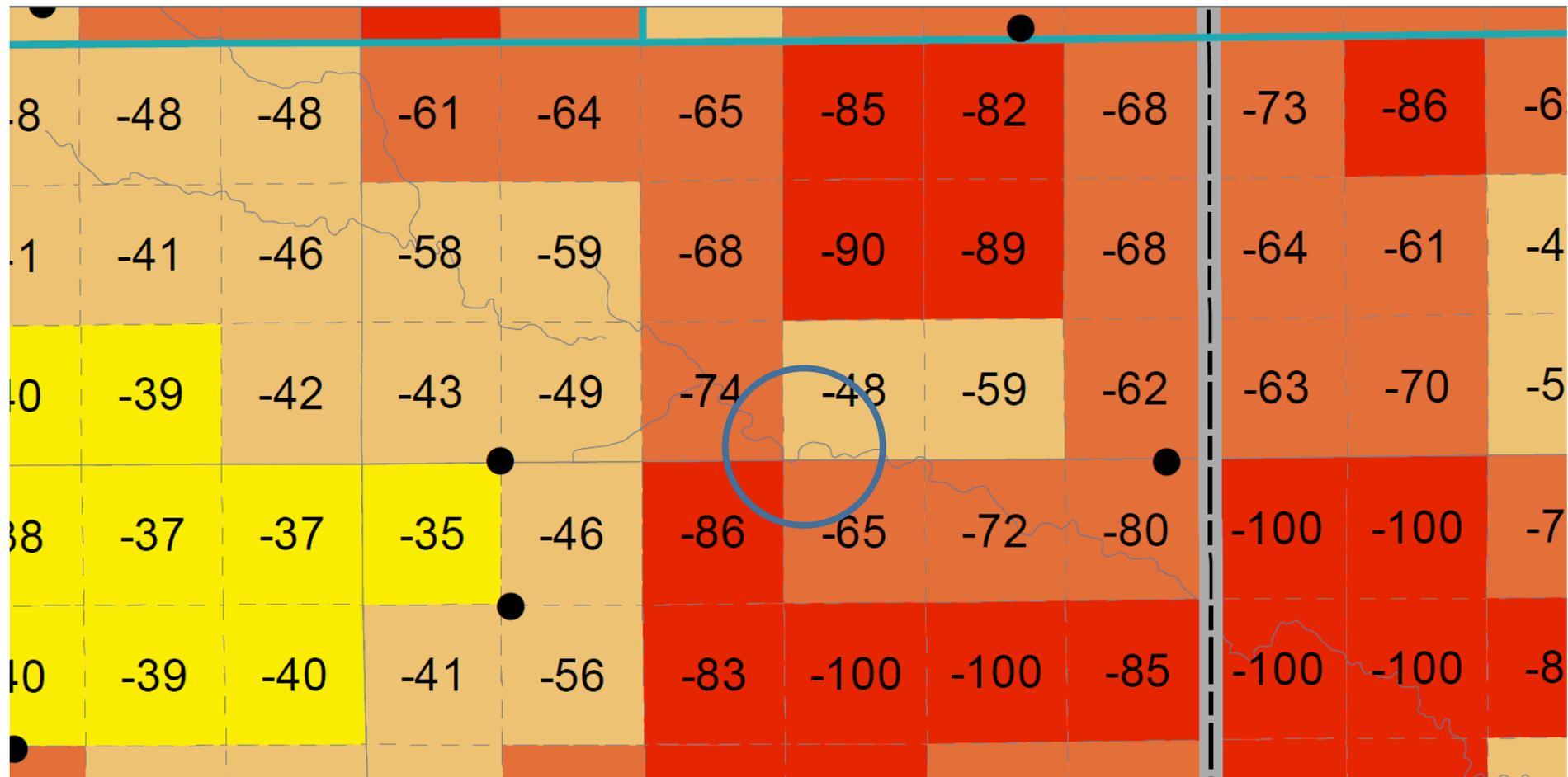


Kansas area hydrographs



Replenish a depleting groundwater supply.

Project map here is percent loss in saturated thickness since pre-development.



Central Colorado Water Conservancy District

Aquifer recharge sites



GMD3 Mission

Act on a shared commitment to conserve and develop water supply to grow the social, economic, and natural resources well-being of the district for current members and future generations in the public interest.

Questions?

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